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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/692,646

10/24/2003

John Kevin McCoy

12093/930

8631

26646 7590 04/01/2009

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EXAMINER

LIGHTFOOT, ELENA TSOY

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

04/01/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/692,646	Applicant(s) MCCOY, JOHN KEVIN	
	Examiner Elena Tsoy Lightfoot	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,6-10 and 12-24 is/are pending in the application.
- 4a) Of the above claim(s) 13-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,6-10,12 and 17-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

Amendment filed on February 2, 2009 has been entered. Claim 4 has been cancelled. New claims 17-24 have been added. Claims 1, 2, 6-10 and 12-24 are pending in the application. Claims 13-16 are withdrawn from consideration as directed to a non-elected invention.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 24 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 24 recites “wherein the infiltrating of the arrangement with the precursor liquid results in incorporation of the precursor liquid **into a center** of the arrangement”, which renders the claim indefinite because it is not clear whether the precursor liquid should be *only* in the center of the arrangement or in the center as well.

For examining purposes the phrase was interpreted as “wherein upon ~~the~~ infiltrating of the arrangement with the precursor liquid, ~~results in incorporation of the precursor liquid~~ penetrates to into a center of the arrangement”.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, 6-10, 12, and 17-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carley-Macauly et al in view of Nicholson et al and Mysels, and further in view of Burnham et al (US 3,129,141) and Smith et al (US 6,190,162).

As to claims 1, 2, 6-10, 12, 17-23, the cited prior art is applied here for the same reasons as set forth in the Office Action mailed on 10/2/2008 because claims recite the same limitations.

As to claim 21, Carley-Macauly et al teaches that artefacts comprising particles of fuel material may be impregnated as a mixture of *powders* or may be preformed into *larger granules*, e.g. by compacting with or without a suitable binder followed by crushing (See column 3, lines 12-17).

As to claim 24, it is the Examiner's position that the liquid precursor would reach to the center of the arrangement inherently because the process of cited prior art would be substantially identical to that of claimed invention.

Response to Arguments

7. Applicants' arguments filed March 5, 2008 have been fully considered but they are not persuasive.

Rejection of Claims 1, 2, 4, 6-9, 11-12 under 35 U.S.C. §103(a).

Carley-Macauly

Applicants submit that in contrast to the presently claimed method, the clear teaching of Carley-Macauly is that hydrocarbon gases that polymerize should be avoided, as polymerization results in deposition in "unwanted places." See Carley-Macauly, column 4, lines 35 to 38. Therefore, Carley-Macauly does not disclose or suggest a method that requires polymerization, provides no reason for one of ordinary skill in the art to obtain such a method, and, thus, fails to provide any reason for one of ordinary skill in the art to use a process that results in the formation of a solid polymer, as presently claimed.

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The argument is unconvincing because at column 4, lines 35 to 38 Carley-Macaully teaches to avoid polymerization *before* graphitizing to make uniform coating. Note that curing in claimed invention is also carried out *after* impregnation.

As to Carley-Macaully not requiring polymerization, first of all, olefinic hydrocarbon (though less preferred hydrocarbon) *after* impregnation to “**wanted**” places (while avoiding deposition in “unwanted” places) does polymerize in the “**wanted**” places when heated to high temperatures. Second, it is held that one cannot show nonobviousness by attacking references *individually* where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Nicholson

Applicants submit that Nicholson does nothing to overcome the deficiencies of Carley-Macaully. As cited in the Office Action, at column 5, lines 63 to 70, and column 6, lines 10 to 16 and 20 to 22, Nicholson discloses depositing carbon in the pores of a refractory body, and converting the carbon to silicon carbide by releasing free silicon to react with the carbon. Nicholson does not disclose or suggest, and provides no reason for one of ordinary skill in the art to thermally treat an arrangement, comprising porous uranium dioxide, that is infiltrated with a precursor liquid, such that the precursor liquid is converted to a second phase, where the step of thermally treating the infiltrated arrangement comprises curing the arrangement, converting the precursor liquid into a solid polymer, and thermally firing the cured porous uranium dioxide arrangement, as presently claimed. Even if one of ordinary skill in the art combined the disclosure of Nicholson with that of Carley-Macaully, the resulting combination would not provide the presently claimed method.

The argument is unconvincing because Nicholson is a *secondary* reference which is relied upon to show that a *liquid* carbon precursor may be used for depositing carbon instead of hydrocarbon *gases* in Carley-Macaully.

Mysels

Applicants submit that Mysels does nothing to overcome the deficiencies of Carley-Macaully and Nicholson. Mysels carbon can be deposited in the pores of a fuel element by placing a phenol-formaldehyde prepolymer or furfuryl alcohol monomer/prepolymer into the pores of the fuel element, curing the prepolymer, and then decomposing the cured polymer. However, as discussed above, the clear teaching of Carley-Macaully is that materials that polymerize on heating should not be used in the disclosed method, as polymerization results in

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deposition in "unwanted places." Therefore, the combination of the disclosure of Mysels with that of Carley-Macaulay is not proper. One of ordinary skill in the art following the teaching of Carley-Macaulay would not deposit carbon with a material that polymerizes during deposition.

However, as was discussed above, olefin in Carley-Macaulay is that materials that polymerize on heating.

Burnham

Applicants submit that Burnham does nothing to overcome the deficiencies of Carley-Macaulay and the other cited references. Burnham discloses a fuel element, a fuel element material for nuclear reactors, and a process for making such fuel elements. Burnham, column 1, lines 11 to 13. The fuel element disclosed by Burnham contains silicon bonded silicon carbide as a base material into which a desired amount of fissionable material is incorporated. Column 1, lines 25 to 29. The disclosed fuel element "comprises a dense body consisting essentially of uranium carbide, graphite, silicon carbide and silicon." Column 1, lines 33 to 35. The uranium carbide is supported by a matrix of silicon bonded silicon carbide, where the uranium carbide is dispersed substantially uniformly throughout the silicon bonded silicon carbide matrix. Column 1, lines 38 to 47. Thus, Burnham discloses nuclear fuel material interspersed into a silicon/silicon carbide matrix. That is not the product of the presently claimed method, which, in one embodiment, comprises silicon carbide interspersed in the pores of an arrangement comprising porous uranium dioxide. Burnham, whether taken alone or in combination with the other cited references, does not disclose or suggest the presently claimed method, and provides no reason for one of ordinary skill in the art to obtain the presently claimed method. One of ordinary skill in the art combining the disclosure of Burnham with that of Carley-Macaulay and the other cited references would not obtain the presently claimed method.

The Examiner respectfully disagrees with this argument. Burnham is a *secondary* reference which is relied upon to show that graphite and silicon carbide are suitable for making a dense body of a nuclear reactor fuel element. It is held that the selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

Smith

Applicants submit that Smith does nothing to overcome the deficiencies of Carley-Macaulay and the other cited references. Smith discloses an infrared heater, and methods of making the heater. The heater contains a gas fired burner, having a metallic burner body with a combustion plenum chamber, a matrix which covers the combustion mixture plenum, and a

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screen made of fibers treated with a silicon carbide forming mixture. The matrix is made from ceramic or metallic fibers treated with a pre-ceramic polymer containing silicon and carbon. As stated in the Office Action, the pre-ceramic polymer may be AHPCS (allylhydridopolycarbosilane). Smith discloses that AHPCS is a liquid base pre-ceramic polymer. Column 3, lines 30 and 31. Smith further discloses that the properties of AHPCS include a viscosity in the range of about 250 to about 8,000 millipoise, a specific gravity of about 0.95, and a cure temperature of about 250° to about 400°C. Column 3, lines 35 to 38. However, Smith does not disclose or suggest that the AHPCS is cured prior to pyrolysis during the manufacture of the heater, and provides no reason for one of ordinary skill in the art to do. Instead, Smith discloses that a screen is treated with a silicon carbide forming mixture, such as the liquid base pre-ceramic polymer AHPCS, which is then pyrolyzed at a temperature of up to about 1,000°C. Smith does not disclose or suggest that the AHPCS is first cured to form a solid polymer, and then thermally fired, as presently claimed. Even if one of ordinary skill in the art combined the disclosure of Smith with that of Carley-Macaulay and the other cited references, the resulting combination would not provide the presently claimed method. Instead, one of ordinary skill in the art, following the disclosure of Smith the other references would pyrolyze the AHPCS without first curing the liquid base pre-ceramic polymer.

The Examiner respectfully disagrees with this argument. First of all, Smith is a *secondary* reference which is relied upon to show that SiC may be deposited on a substrate by applying to the substrate a liquid AHPCS, *curing* the polymer at temperature 250⁰C - 400⁰C to a silicon carbide pre-ceramic polymer mixture preferably containing about 96% SiC, about 2% oxygen, and about 2% carbon (See column 3, lines 25-44), then pyrolyzing the silicon carbide pre-ceramic polymer mixture at temperatures up to about 1,000⁰C preferably in the range of 800⁰C - 1,000⁰C in an inert gas atmosphere such as nitrogen or argon (See column 3, lines 45-50). Therefore, it is irrelevant that Smith discloses an infrared heater, and methods of making the heater since AHPCS would be pyrolyzed to SiC on *any* substrate.

Therefore, in contrast to Applicants argument, the combination of Carley-Macaulay and Mysels is proper, and the combination of Carley-Macaulay and the other cited references does provide the presently claimed method, the present claims are obvious over Carley-Macaulay, Nicholson, Mysels, Burnham, and Smith, whether taken alone or in combination.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elena Tsoy Lightfoot whose telephone number is 571-272-1429. The examiner can normally be reached on Monday-Friday, 9:00AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Elena Tsoy Lightfoot, Ph.D.

Primary Examiner

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April 1, 2009

/Elena Tsoy Lightfoot/